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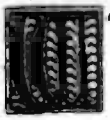

ATER, Water! is the cry everywhere in the metropolis just now; and a very important cry it is. It ought to be reiterated, as we said long and long ago, as loudly as if half London were on fire. Cleanliness ("next to Godliness," it has been long said, but not thought), health, public safety, morality, general progress, are all involved in it. Pure water, and plenty of it, must be had: the question yet to be solved is, "where from?" The Thames, at all events within certain distances, has been unfitted for the purpose,—in parts, indeed, where some of the present supply is obtained, it is pregnant with disease and death. What is to be done for the Thames is as yet unknown:—

"The river Rhine, it is well known,
Does wash the city of Cologne,
But tell me, nymphs, what power divine,
Shall henceforth wash this river Rhine!"

That some of the contaminating influences will be stopped one of these days we may suppose (or we must expect fearful consequences); but we are unable to believe, weighing all the evidence on the subject, that it can ever be made to afford, close to London, a healthful, economic, and sufficient supply. Twenty out of twenty-five schemes submitted to the Board of Health propose still to obtain the supplies either from the Thames itself (mostly from between Twickenham and Mapledurham) or its tributaries; but the officers and advisers of the Board pronounce the water of the Thames, irrespective of exact position, to have inherent objectionable qualities. The Board's own scheme, already described by us, is open to objection, and has been strongly assailed in several quarters, but it does not seem to us to stand in any worse position than it did. The Board have been taking further evidence upon it (we should have been glad if they had examined foes as well as friends), and we do sincerely hope that prejudices will not be allowed to exert any influence, and that the greatest obtainable amount of information and knowledge will be brought to bear upon the inquiry, so that a right result in so momentous a matter may be arrived at.

We are led to these remarks by the reception, from the Board of Health, of four appendices to their "Report on the Supply of Water to the Metropolis," which was made in the middle of last year, and reviewed by us at the time. No. 1 consists of Returns to the Queries addressed to the several Metropolitan Water Companies; No. 2, Engineering Reports and Evidence; No. 3, Reports and Evidence, medical, chemical, and miscellaneous; and No. 4, a Report on the Cesspool system in Paris, by Mr. Thos. W. Rammell.

In No. 2, Mr. Austin gives a brief account of the various schemes for the improvement of the supply which have been laid before the the Board, and pronounces against the sufficiency of any of them. Mr. Rawlinson submits some remarks on the Croton Aqueduct, New York,* in the course of which he says:—

"In examining the Croton Aqueduct, there are several things to be considered, as example, and also as warning. It was a bold step in modern times, to cast about and look for the best supply the district would afford; and, contrary to existing usage, fearlessly to undertake a work which may be fairly considered to parallel the great works of antiquity. That water may with advantage be brought from a distance is now pretty generally allowed and practised, and as the subject becomes better understood, works of this character will be extended; but modern means and appliances in the use of bricks, tiles, and the metals, should prevent any repetition of such works as the Croton Aqueduct. In the Croton work, nothing has been learned or forgotten from the time of the Romans: every feature of it would have been equally well constructed 2,000 years ago. It would be difficult to devise a more expensive work: to cross valleys, or where the natural surface of the ground falls below the plane of grade, the aqueduct is supported upon a foundation wall of stone, forming a solid wall or pier, 17 feet thick, varying in height to suit the natural contour of the valley, and the plane of the aqueduct: placed upon such wall or pier, the true aqueduct or water-way is constructed with a brick lining upon a concrete foundation: the side walls are backed up with rubble masonry. The whole structure thus formed is banked up with earth on each side, trimmed off to a side slope of one to one, the surface of the embankment being paved with rubble. The sectional area of the water-way is in some instances about one-thirtieth that of the whole work, including pier and embankment. On portions of the line, as at Sing-Sing, the Mill River, Jewell's Brook, Hastings, at Jonkers, Clendinning Valley, and other places, masonry structures of the most expensive character have been constructed; but, nevertheless, in several instances it has been found necessary to line the water-way with iron: this is the case over the Clendinning Valley, and at Sing-Sing Kill. At the Harlem River and Manhattan Valley two cast-iron pipes, of 3 feet interior diameter, descend into, and crossing both valleys, delivers the water into the masonry aqueduct on the opposite side. The cost of the Croton Aqueduct may be contrasted with the following table:—

COST OF CANALS IN ENGLAND.

Canals, including Land, have cost per mile as under:—

	Length in miles.	Total cost.	Cost per Mile.
		£.	£.
The Rochdale Canal	21¼	291,800	13,800
The Ellesmere Canal	57	410,000	7,017
The Kennet and Avon	78	431,040	5,344
The Grand Junction	90	501,000	5,565
The Leeds and Liverpool	129	800,000	6,201
The Clyde Canal	35	200,000	5,714
Total	410¼	2,611,800	About 6,370
The Croton Aqueduct	38½	2,800,000	About 71,000

The writer suggests that iron, wrought and cast, may be much more extensively employed in waterworks than has hitherto been the practice. He says,—

"If modern science has taught us how to make a steam-engine, it has not yet fully inculcated the necessity there is that rigid economy should be studied in all engineering works. This, however, must be applied in an especial degree to all works connected with towns' improvements, namely, drainage and water supplies. If twenty houses can be perfectly drained and supplied with water for the cost hitherto charged upon one, and the work much better done, it is the duty of all concerned to see that so desirable a work is accomplished. In laying out new works, due regard must be had to efficiency as to economy, and it must ever be considered that there may be many degrees of cost up to an extreme maximum estimate, but there is only one minimum; and it will require constant attention, labour, and care, to secure this. Incompetency is adequate to any of the first; knowledge and judgment, with care, are requisite to secure the latter."

Mr. W. C. Mylne says, as to the advantages of the *constant* supply,—

"I think that where a domestic supply is required for a moral and well-conducted population, the constant system of supply is, under certain provisions, the most efficient, and in annual cost, I conceive, the cheapest. This opinion is given independent of sanitary requirements, with the extent of which we are at present but little acquainted. To work such an establishment well, it should be originally constructed for this system of supply, and the pipes should be laid deep in the ground to avoid the effects of frost. In expressing this opinion on the constant supply, I do not support the abandonment of the cisterns and tanks in respectable dwellings: one or more in every large house is essential for closet purposes, for steam apparatus, and to meet cases of unavoidable interruption of supply during repairs."

Captain Vetch says that, considering the probable increase of London, he considers *all* the best supplies of water that can be obtained near London should be secured, and recommends, first,—

"The Lea aqueduct, 14 miles long, to bring in a supply of 7,000,000 of cubic feet per diem, and deliver the same at an elevation of 140 feet above Trinity high-water mark.

Secondly, The Darenth aqueduct, 13 miles long, to bring in a supply of 3,000,000 of cubic feet per diem.

Thirdly, The Colne aqueduct, 12 miles long, to bring in 3,000,000 per diem.

Fourthly, The Mole aqueduct, 15 miles long, to bring in, from a point on the course of that river, a little way above the village of Betchworth, about 3,000,000 of cubic feet per diem."

Mr. W. Gale gives full illustrations of the Gorbals Gravitation Water Company's works, at Glasgow.——Mr. F. Braithwaite says, relative to supplies from *artesian wells*, as the result of a large experience in sinking wells;—

"I am of opinion that the result of my observations warrants me in conforming to the views of Dr. Buckland and other geologists, who consider the water in the deep springs under London or of the London basin as exhaustible, and that, comparatively, in a very rapid degree. I therefore differ with the projectors of the Artesian wells, who are, in my opinion, led into error by the partial success of wells sunk in a deeper part of the assumed basin. I allude more particularly to the *three wells* sunk, one opposite the National Gallery, and two others in Orange-street. If I may be permitted to digress, I am of opinion the Commissioners should obtain *correct* information touching these wells. But I wish it to be distinctly understood that I admit that there is still a large quantity of water in certain localities both in the land and sand springs, but I entertain serious doubts if any large quantity of water is to be obtained from the chalk under the metropolis; for in several of the chalk-spring wells, although but *recently* sunk, the water is sensibly declining."

The same appendix contains evidence in favour of the small-pipe system of drainage, and of combined back drainage instead of front drainage. As to the small pipes, Mr. Lovick, one of the metropolitan sewers' surveyors, says:—

"A great number of small 4-inch tubular drains have been laid down in the several districts, some for considerable periods. They have been found to keep themselves clear by the ordinary soil and drainage waters of the houses. I would refer to fifteen houses in the cloisters at Westminster Abbey, which have now for upwards of fourteen months been drained by small stoneware pipes, varying in diameter from 3 and 4 inches for the houses, to 9 inches for the outlet, and which have acted and continue to act in the most perfect manner. I have been furnished by Mr. Morris, of Poplar, with accounts of blocks of houses in his district drained by small pipes. One is a block of twelve houses in a court, six on each side: each six are drained *at the back* by one 4-inch pipe. They are connected with the closets, one to each house, to which the water *is not* laid on, the water being thrown down them by the inmates: the only other source of supply is from the overflow of the butts in the yards, yet the pipes have kept themselves clear from the period when first laid down, now upwards of twelve months since, to this time, and are still acting efficiently."

* Described in The Builder some time ago.

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